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WHITHAM, CURTIS & CHRISTOFFERSON, P.C.
11491 SUNSET HILLS ROAD
SUITE 340
RESTON, VA 20190

EXAMINER

KLIMOWICZ, WILLIAM JOSEPH

| ART UNIT | PAPER NUMBER |
|----------|--------------|
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2652

DATE MAILED: 12/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/803,144

Applicant(s)

HAYASHI ET AL.

Examiner

William J. Klimowicz

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 October 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 15-63 is/are pending in the application.
- 4a) Of the above claim(s) 25 and 27-63 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 15-19, 21-23 and 26 is/are rejected.
- 7) ☒ Claim(s) 20 and 24 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 March 2004 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☒ Certified copies of the priority documents have been received in Application No. 09/916,529.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 3-18-04, 12-03-04
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

Applicants' election without traverse of Species VIIIa (corresponding to Figures 58-64) in the reply filed on October 7, 2004 is acknowledged.

The Applicants contend that claims 15-26 are readable on the elected Species.

It is noted, however, that claim 25 which recites in part "wherein at least part of said first magnetic layer is in direct contact with said vertical bias layer" does not correspond to the elected embodiment. As shown in the elected embodiment of Figures 58-64, the first magnetic layer (8b or 8) does not contact the vertical bias layer (2b) at any point, since layers (13) and (12) intervene between (8b) and (2b). The *second* magnetic layer (12), however, does directly contact the vertical bias layer (2b).

As such, claims 25, 27-63 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on October 7, 2004.

Continuation

The instant application is a division of U.S. Patent Application Serial Number 10/442,209, filed on May 21, 2003, now U.S. Patent No. 6,747,853, which itself was a division of U.S. Patent Application Serial Number 09/916,529, filed on July 30, 2001, currently pending.

Claim Status

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Claims 1-14 have been voluntarily cancelled by the Applicants in an amendment filed March 18, 2004.

Claims 15-63 are currently pending.

Claims 25, 27-63 have been withdrawn from consideration as being drawn to a non-elected embodiment.

Specification

The disclosure is objected to because of the following informalities:

With regard to the instant specification as it pertains to the section regarding the elected embodiment (Species VIIa corresponding to Figures 58-64 at pages 59 third full paragraph through page 65, line 12), it is noted that the reference designator **8b** ("first magnetic layer") shown in the Figures is merely referenced as designator **8** (e.g., see page 61, line 11, line 18, etc.) within the specification. The specification should be amended to change this reference designator to **8b** as is depicted in the Figures.

The reference designator **66a** (e.g., see Applicants' specification at page 60, lines 25, 27, 28 and 27) corresponding to the "magneto-resistance effect head" is inconsistently changed to the designator **65a** at page 63, line 8, line 15, etc. The Applicant should, firstly, depict such a designator in the drawing (see objection to drawings, *infra*) and, secondly, maintain consistency as either designator **65a** or **66a**.

Appropriate correction is required.

Drawings

The drawings are objected to because the reference designator **65a** (or **66a**) (e.g., see page 63, line 8) of Applicants' specification, is not depicted in the drawings. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an

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international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 15-19, 21-23 and 26 are rejected under 35 U.S.C. 102(e) as being anticipated by Carey et al. (US 6,266,218 B1).

As per claim 15, Carey et al. (US 6,266,218 B1) discloses a magneto-resistance effect element (e.g., see the embodiment of FIG. 14) comprising: a lower conductive layer (lowermost depicted 134 in contact with an unshown "bottom electrical lead layer" - see COL. 10, lines 43-45); a fixed layer (126) provided on the lower conductive layer (including unshown bottom lead layer on lowermost depicted 134) and having a pinned orientation of magnetization (represented by "arrow" vector coming out of the page -i.e., the circled "x"); a first non-magnetic layer (130) provided on the fixed layer (126); a free layer (122) provided on the first non-magnetic layer (130) and having an orientation of magnetization (represented by "arrow" vector pointing to the right) varied by a magnetic field applied thereto; a first magnetic layer (e.g., 84) provided on the free layer (122) and magnetically coupled to the free layer (longitudinal bias provided in part by layer (84) of laminate layer (90)); a second magnetic layer (e.g., 86) provided on the first magnetic layer (84) ("on" being used to indicate contact with or extent over [a surface] regardless of position) and magnetically coupled to the first magnetic layer (84) (through exchange coupling layer (88)); and a vertical bias layer (uppermost depicted 134 - AF layer - which is in direct contact with (86)) for applying a magnetic field (antiferromagnetically via exchange coupling) to said first (84) and second (86) magnetic layers, and a sense current for detecting a change in electrical resistance of said first non-magnetic layer (130) flows substantially in perpendicular relation to said first non-magnetic layer (130) (e.g., see discussion at, *inter alia*, COL. 10, lines 33-55).

As per claim 16, wherein said first magnetic layer (84) is equal to or greater than said free layer (122) in length in the direction of the magnetic field applied by said vertical bias layer (AF layer 134) - as seen in FIG. 14.

As per claim 17, wherein said second magnetic layer (86) is equal to or greater than said free layer (122) in length in the direction of the magnetic field applied by said vertical bias layer (AF layer 134) - FIG. 14.

As per claim 18, further comprising a fixing layer (124), disposed between said lower conductive layer (unshown bottom lead) and said fixed layer (126), for pinning the orientation of magnetization of said fixed layer (126).

As per claim 19, further comprising a second non-magnetic layer (e.g., 88) between said free layer (122) and said first magnetic layer (84 (i.e., see FIG. 14 where layer (88) indeed intervenes at least for a prescribed lateral extent, between (84) and (122)).

As per claim 21, wherein said free layer (122) is magnetically coupled to said first magnetic layer (84) by anti-ferromagnetic coupling or ferromagnetic coupling - it acts as part of the longitudinal biasing structure - which is also known in the art as "vertical biasing" - the terms are used interchangeably as it applies to biasing the free layer into a single magnetic domain state to obviate magnetic domain wall movement called Barkhausen noise).

As per claim 22, wherein said first magnetic layer (84) is magnetically coupled to said second magnetic layer (86) by anti-ferromagnetic coupling or ferromagnetic coupling (via coupling layer (88)).

As per claim 23, wherein the product of saturation magnetization and film thickness of said first magnetic layer (84, which corresponds to 12 in FIG. 2A) is substantially equal to the

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product of saturation magnetization and film thickness of said second magnetic layer (86, which corresponds to 14 in FIG. 2A). See Figure 2A and also COL. 2, line 66 through COL. 6, line 21.

As per claim 26, wherein at least part of said second magnetic layer (86) is in direct contact with said vertical bias layer (AF layer (134)).

Allowable Subject Matter

Claims 20 and 24 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

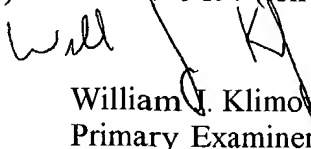
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to William J. Klimowicz whose telephone number is (703) 305-3452. The examiner can normally be reached on Monday-Thursday (6:30AM-5:00PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa T. Nguyen can be reached on (703) 305-9687. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


William J. Klimowicz
Primary Examiner
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WJK